

**KEY WORDS IN DIGITAL HEALTH - A BRIEF GLOSSARY BY SYTE**

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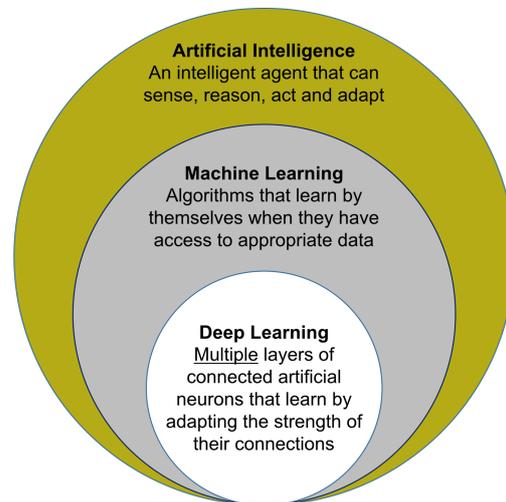
Syte is a specialized Digital Health Strategy Advisory with experience of more than 20 years in the medical field. Key customer groups are globally active insurance, medtech, pharma and IT companies. This document provides a short overview about key definitions in Digital Health.

These terms are also used in other Syte studies such as “A Brief Guide to Digital Health for Insurance Companies”, “Global Investment Trends”, “Global Digital Hub Study” and “AI in Healthcare”.

Syte has composed an overview about key Digital Health terms and current applicability levels in Digital Health (Q4 2017):

**Term:** Artificial Intelligence (AI)

**Term definition:** The term "Artificial Intelligence" is applied when a machine mimics "cognitive" functions that are associated with human cognition, such as "learning" and "problem solving" (Russel, Norvig, 2009). AI has many subcategories due to the different manifestations of intelligence. Within the learning domain, “Deep Learning” and “Machine Learning” are the most present ones.



**Real world example:** Guiding patients through surgery preparation and recovery to cut down patient risk and reduce costs of care. (Example company: PeerWell)

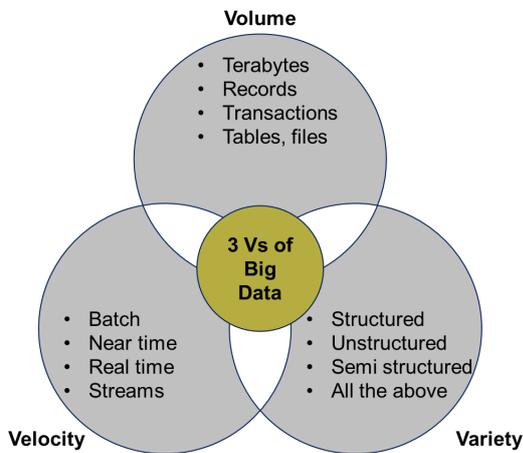
**Applicability in Digital Health:**



**Term:** Big Data

**Term definition:** Datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze (Big Data, Mayer-Schönberger, Cukier, 2013).

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**Real world example:** Improving private data analysis in population health and precision medicine, collecting and encrypting data when they are created and providing private access to its true owner. A complete history of the data and its linkages is kept throughout the lifetime of the data point. (Example company: HealthLinkages)

**Applicability in Digital Health:**



**Real world example:** Predictive analytics based CRM for hospitals, health systems, ACOs and payers. (Example company: CareScore)

**Applicability in Digital Health:**

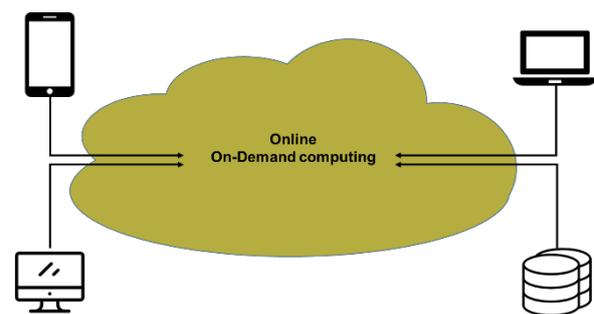
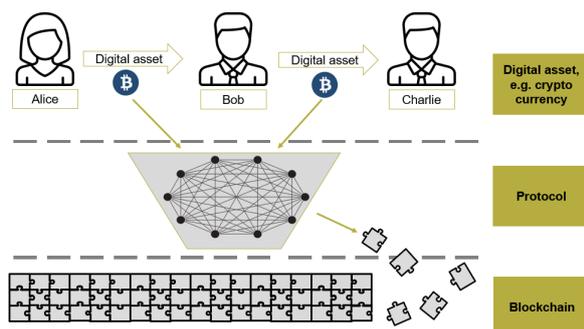


**Term:** Cloud Computing

**Term definition:** Cloud computing is an information technology solution, a model for enabling ubiquitous access to shared pools of configurable resources (such as computer networks, servers, storage, applications and services), which can be rapidly provisioned with minimal management effort, mostly over the internet (Demystifying Cloud Computing, Qusay, 2011).

**Term:** Blockchain

**Term definition:** A blockchain is a continuously growing list of records, called blocks, which are linked and secured using cryptography. By design, blockchains are inherently resistant to modification of the data. A blockchain can serve as "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way." (Blockchain: Blueprint for a New Economy, Swan, 2015)



**Real world example:** Especially in combination with connected devices (see "Internet of Things"), Cloud Computing offers tremendous potential for insurance providers, e.g. in health coverage. (Example company: Amazon Web Services)

**Applicability in Digital Health:**



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**Term:** Data Mining

**Term definition:** The process of collecting, searching through, and analyzing a large amount of data in a database, as to discover patterns or relationships. (Advances in knowledge discovery and data mining, Fayyad et. al, 1996)



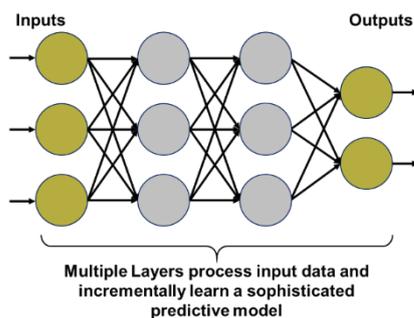
**Real world example:** Developing new product lines, health insurers can increase profitability by identifying the most lucrative customer segments and then prioritizing marketing campaigns accordingly. To maximize profitability the "right" policy or the "right" rate shall be offered to the "right" customer segment at the "right" time. (Example company: QuanTemplate)

**Applicability in Digital Health:**



**Term:** Deep Learning

**Term definition:** Connected networks of artificial neurons are used as a powerful concept for supervised learning, i.e. learning under supervision of the programmer. The addition of more layers to the network enables it to represent complex functions between the input and the output. The expressions Deep Neuronal Learning or Deep Neural Networks can be used interchangeably. (Syte, 2017)



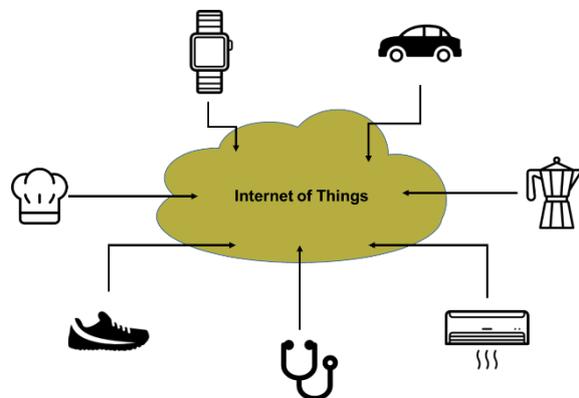
**Real world example:** Underwriting processes need to evaluate and handle various sources of information to make a predictive judgement. Rule based systems for instance can be limited in how they process complex interdependencies. However, Deep Learning can be used to build large and sophisticated predictive models in healthcare that can digest a large amount of data to make interferences. Such systems can also be designed for continuously updating their internal model when new information becomes available. This way, the model improves incrementally. (Example company: Arya)

**Applicability in Digital Health:**



**Term:** Internet of Things (IoT)

**Term definition:** The Internet of Things (IoT) comprises the network of physical devices, vehicles, and other items embedded with electronics, software, sensors, and network connectivity which enable these objects to collect and exchange data. (Internet of Things (IoT): A vision, architectural elements, and future directions; Gubbi et al.; 2013)



**Real world example:** The IoT is helping insurers to accurately price premiums because the vast amount of data IoT devices generate allows companies to create superior risk

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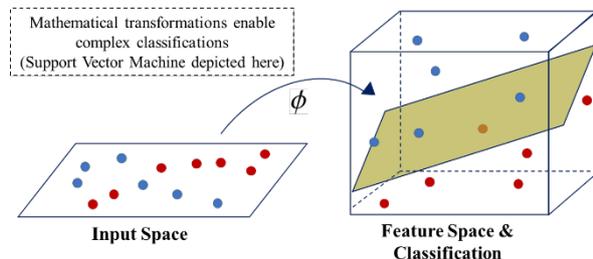
assessments, create better models for future insurance payouts, and attract new customers through a wider portfolio of insurance offerings. (Example: Apple Watch)

**Applicability in Digital Health:**



**Term:** Machine Learning

**Term definition:** Machine learning techniques (ML) comprise algorithms that learn by themselves when appropriate data is fed to them. A big advantage over conventional algorithms is the fact that they do not need to be explicitly programmed. ML can be used for supervised, unsupervised or reinforcement learning. Typical tasks involve regression, clustering or regression. (Syte, 2017)



**Real world example:** Insurers use machine learning to predict premiums, conversion and losses for the policies that brokers submit based on the data available on the first day. This practice helps underwriters to focus on the most valuable business. Detecting good risks early enables insurers to make better use of the underwriters' time and delivers a significant competitive advantage. (Example company: Cloudera)

**Applicability in Digital Health:**



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Experience in M&A and strategy consulting with a focus on Digital Health. Guestlectured at IMD Lausanne and University of Passau. Executive education at Said Business School, University of Oxford.



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